

### Information related to the use of the IT-BSE-Matrix

With the help of the IT-BSE-Matrix existing and new programs of initial and further vocational education could be described in a competence-orientated way.

**The working field of Building Service Engineering includes competences of various professions of initial and further vocational training.** Examples for initial vocational programs are the Plant mechanic for sanitary, heating and air conditioning systems, the Electronics technician – specializing in energy and building technology and equivalent occupations. For this reason the units of the matrix is formulated in a very general way. **As a help for identifying units of the matrix which are in a relationship to an existing initial or further vocational education you can use the definitions and the explanations below**, particularly the explanations and examples to Technical Building Equipment..

The whole matrix describes units from EQF-Level 3 to EQF-Level 6. The level of expectation in the matrix increases vertical an horizontal

<b>Building Systems</b>	Building Systems encompass all technical components and Processes of Building Systems during the stages of planning, constructing, operating and dismantling a building.
<b>Processes of Building Systems</b>	In accordance with Facility Management Processes of Building Systems encompass all technical and service-related processes during the stages of planning, constructing, operating and dismantling a building (e.g. switch-on time of lighting, ventilating and air-conditioning systems, cycles of building cleaning, attendance time, energy flows, operating hours of monitoring systems).
<b>Components of Building systems</b>	Components of Building Systems encompass the particular technically-relevant elements (building envelope and Technical Building Equipment [TGA]) during the stages of planning, constructing, operating and dismantling a building.
<b>Building Envelope</b>	The Building Envelope encompasses: - transparent components (glass facades, windows, doors, skylights...), - optically-opaque (light-tide) components (stonework, roof, insulation, doors...), - transitions between transparent and optically-opaque components (heat bridges: stonework<->windows).
<b>Technical Building Equipment</b>	TGA encompasses: - Installations and systems of heating technology including regenerative energies (e.g. condensing boiler, district heating, solarthermics, heat pumps, fuel cells) - Installations and systems of air-conditioning and ventilation technology including energy recuperation and regenerative energies (e.g. ventilating and air-conditioning systems, heat exchangers, heat recovery devices) - Installations and systems of sanitary technology including regenerative energies (e.g. drinking water storage tanks, solarthermics, heat pumps, drainage installations) - Installations and systems of electrical energy supply including energy recuperation and regenerative energies (e.g. PV systems, fuel cells, combined heat and power, power distribution systems, uninterruptible power supply, switchgears, measuring devices, compensation systems) - Installations and systems of lighting technology and emergency lighting (e.g. general lamps/illuminants, escape signs, ballasts, light control systems, dimmers, motion detectors, daylight sensors, lighting management systems [DALI]) - Installations and systems of building automation (e.g. sensors [feeler, motion detectors], auctators (shutters, valves), bus systems, access control systems, interior lighting, controlling heat and air-conditioning systems) - Installations and systems of information and communication technology (PBX-systems, intercom systems, Ethernet-based network technology, installations and systems of safety systems and emergency energy supply).

## Mapping

1. Ausbildungsabschnitt /Jahr  
2. Ausbildungsabschnitt / Jahr

	Competence areas (core working process)	Steps of competence development:							
1.	<b>Assembling and dismantling of building systems or components</b>	He/She can under supervision assemble and dismantle particular components of building systems according to given assembly/disassembly schedules regarding established norms and standards.  He/She can under supervision properly dispose particular components of building systems in compliance with legal requirements.		He/She can autonomously assemble and dismantle components of building systems according to given assembly schedules regarding established norms and standards.  He/She can autonomously properly separate and dispose components and materials of building systems in compliance with legal requirements.		He/She can according to instructions plan and document the assembling and dismantling of components of building systems.		He/She can develop concepts of assembling, dismantling and disposal of building systems.	
2.	<b>Controlling, servicing and maintaining building systems or components</b>	He/She can according to instructions operate and check the functioning of components of building systems.	He/She can autonomously operate and check the functioning of components of building systems.	He/She can carry out repair and maintenance work according to the instructions and document the working process.	He/She can autonomously carry out complex repair and maintenance work and make modifications when necessary.  He/She can autonomously document complex repair and maintenance work and possible modifications.	He/She can self dependent/on one's own responsibility carry out and document preventive maintenance.	He/She can plan, define and document maintenance measures to ensure the functioning of components of building systems in compliance with legal requirement.	He/She can plan, define and document maintenance measures to ensure the functioning of building systems in compliance with legal requirement.	He/She can create a maintenance concept with regard to an ideal service level and organize its implementation in the team.  He/She can identify the requirements for an ideal maintenance management and take them into consideration during the planning stage.
3.	<b>Taking building systems and components into operation</b>	He/She can according to instructions and under supervision regulate or configure components of building systems and take them into operation.	He/She can autonomously regulate or configure components of building systems and take them into operation.	He/She can according to instructions and under supervision take complex installations of building systems into operation and prepare documentation and test reports according to established norms and standards.	He/She can autonomously take complex installations of building systems into operation and prepare documentation and test reports according to established norms and standards.	He/She can check, evaluate and document the adherence of the complex installations of building systems to established quality and safety requirements during start-up operations.		He/She can hand over the building system to the operator and give a briefing on usage and legal responsibilities.  He/She can document the handing over.	
4	<b>Monitoring and optimizing processes of building systems with the help of automatic equipment</b>	He/She can according to instructions and under supervision handle systems of building automation to ensure safe operating conditions.	He/She can autonomously handle systems of building automation to ensure safe operating conditions.	He/She can collect, document and analyse data during malfunctions.	He/She can develop and implement solution strategies during malfunctions.	He/She can modify and document automated installations of building systems, when conditions of use change.		He/She can optimize, implement in the team and document processes of building systems with the help of data from building automation according to facility management.	

5	<b>Creating concepts for (processes of) building systems or their component-/sub-processes</b>	He/She can identify need-based and user-oriented requirements and define them in a user profile.	He/She can find out about legal requirements and take them into consideration (safety technology, energy efficiency, accessibility).	He/She can scale and select components of building systems according to legal obligations and customer requirements. He/She can document scale and selection.	He/She can scale and select building systems according to legal obligations and customer requirements. He/She can document scale and selection.	He/She can plan and realize processes for components of building systems in terms of facility management.	He/She can plan and realize processes for building systems in terms of facility management.	He/She can organize the documentation for all data relevant for operation in an object folder.	He/She can prepare tender documents on the basis of legal requirements and user profiles together with the team.  He/She can propose optimising potential for new systems, instruct staff for the realization and document the overall process.
6.	<b>Identification, Realization and checking of legal requirements for the operation of building systems (operator responsibility)</b>	He/She can identify the legal requirements for operating a building system on the basis of guidelines and regulations.		He/She can implement and document the legal requirements for operating building systems and their components.	He/She can autonomously prepare documents to check the legal requirements.	He/She can if necessary in a team create a risk assessment (risk analysis). He/She can take the results into consideration during the organisation of the operation and staff planning of building systems.		He/She can create/optimize as well as in the team guidelines for the realization of legal requirements on the basis of his/her experience to gain insights relevant for future planning processes.	
7.	<b>Monitoring costs and controlling</b>	He/She can calculate basic data to monitor costs (planning, construction, operation, dismantling of building systems).	He/She can autonomously calculate basic data to monitor costs (planning, construction, operation, dismantling of building systems).	He/She can analyse basic data to monitor costs (planning, construction, operation, dismantling of building systems) and calculate key figures.  He/She can analyse key figures to monitor costs (planning, construction, operation, dismantling of building systems).	He/She can use key figures (planning, construction, operation, dismantling of building systems) within a benchmarking system to identify optimising potential.		He/She can realize identified optimising potential, instruct staff for the realization and document the overall process (planning, construction, operation, dismantling of building systems and components).		
8.	<b>Marketing</b>	He/She can according to instructions identify customer needs and observe market trends.	He/She can autonomously identify customer needs and observe market trends.	He/She can conduct subject-oriented conversations on the basis of user profiles or market trends focussed on customer's aims.	He/She can initiate/recommend measures to improve customer satisfaction.	He/She can analyse and anticipate market trends and communicate them to the customer.		He/She can assess own market positions and concepts and develop strategies safeguarding his/her future.	
9.	<b>Project management</b>	He/She can identify the actual state of building systems and processes.		He/She can define and document the target concept of building systems and processes.	He/She can define work packages to achieve the target concept and determine and document time-related dependencies.	He/She can control, monitor and supervise the project progression with the help of project management software.		He/She can evaluate and document the project progression with the help of project management software and gain insights relevant for future planning processes.	
10.	<b>Personnel management</b>	He/She can create/provide plans of action and work schedules		He/She can identify training requirements for staff and conduct need-oriented training.	He/She can conduct appraisal interviews with staff, fix target agreements and assess staff.	He/She can assess his/her management style, identify development potentials of staff and initiate support measures.		He/She can define criteria for an appropriate selection of staff with reference to job descriptions and autonomously plan personnel requirement.	